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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the managing server used in order to build the equipment management system for managing the operating state of administration object apparatus via communication media, and an equipment management system, and the recording medium in which computer reading is possible.

[0002]

[Description of the Prior Art] In recent years, since the computer and the LAN related equipment became a low price, in the company, the network of various kinds of commercial equipment (a personal computer, a printer, a copy, etc.) is advanced. As a result, it has been a matter indispensable to execution of business to manage a network so that it may function good, and the administrator (or administration) who performs only network management and management usually exists in the company which uses the network containing a lot of apparatus.

[0003] Thus, since the importance of network management increased, the art for network management is also developed. For example, as typically shown in drawing 14 as art which can supervise the state of the apparatus connected to the network by a web browser, The managing server 41 collects status information with a constant period from the surveillance object apparatus 42, When a predetermined demand is advanced from the client apparatus 43 (web browser), based on the status information currently collected, the system which returns the picture data showing the state of the surveillance object device 42 to the client apparatus 43 is known.

[0004]

[Problem(s) to be Solved by the Invention] If the above-mentioned system is used, the state of the administration object apparatus 42 is manageable by a web browser. However, in the above-mentioned system, there was a problem that the screen displayed by the web browser was what shows the state of the surveillance object apparatus 42 at the time of pointing to the display of a screen. That is, the user had to direct execution of reloading to the web browser to display the screen in which the state of the surveillance object apparatus 42 at present is shown. If reloading is made to be performed periodically, the state of

the surveillance object apparatus 42 can be made mostly displayed in real time, but network traffic will increase in this case. That is, a network resource will be consumed vainly.

[0005]Then, the technical problem of this invention can grasp the state of administration object apparatus in real time by a web browser, and there is in providing the managing server which can moreover build the equipment management system with which a network resource is not consumed vainly, and such an equipment management system. Other technical problems of this invention are computers, and are related with the recording medium with which the program for realizing such a managing server was recorded and in which computer reading is possible.

[0006]

[Means for Solving the Problem]In order to solve an aforementioned problem, in this invention One or more sets of a managing server and administration object apparatus. It faces constituting an equipment management system to which one or more sets of browsers were connected by communication media in an available client apparatus, When change of a state is detected as each of one or more sets of administration object apparatus by detection means to detect an

own state, status information storage means which memorizes state information showing the state where it was detected by this detection means, and a detection means, A thing provided with a reporting means which reports that a state changed to a managing server via communication media, and a demand response means which reads state information demanded from a managing server from a status information storage means, and sends it out to a managing server is used.

[0007]And when a screen information demand which includes information which specifies administration object apparatus as a managing server is received from a client apparatus, The 1st demand response means which acquires state information from administration object apparatus specified for the information concerned via communication media, and supplies screen information according to the state information to a client apparatus which advanced a screen information demand, When an apparatus detailed screen demand including information which specifies administration object apparatus is received, The demand to a taken-out client apparatus the client apparatus, When it is HTML data which will perform apparatus detailed screen display processing which is the processing which displays an apparatus detailed screen based on screen

information which advanced a screen information demand and was supplied as the response and a notice of a status change is received, The 2nd demand response means which returns HTML data which will rerun apparatus detailed screen display processing, A client apparatus with which HTML data were supplied by this 2nd demand response means, When it is notified that that a state changed from administration object apparatus is a memory measure which memorizes information which can specify administration object apparatus related to supplied HTML data, A specifying means which specifies a client apparatus which shows a device detailed screen of the administration object apparatus based on information memorized by memory measure. A thing provided with a notice delivery means of a status change which sends out a notice of a status change to a client apparatus specified by this specifying means is used.

[0008] That is, in an equipment management system of this invention, when a state of a certain administration object apparatus changes, that is notified to a managing server from the administration object apparatus concerned. When a managing server grasps a client apparatus with which an apparatus detailed screen is displayed and receives the above-mentioned notice from

administration object apparatus, it sends out a notice of a status change to a client apparatus with which an apparatus detailed screen is displayed. A client apparatus (web browser) which received a notice of a status change advances a screen information demand to a managing server. A managing server which received a screen information demand acquires state information of administration object apparatus again, and carries out redisplay of an apparatus detailed screen to a client apparatus (web browser) by returning screen information according to acquired state information to a client apparatus.

[0009] Since a display of an apparatus detailed screen is performed in such a procedure, according to this equipment management system, a state of administration object apparatus can be grasped in real time by a web browser, without increasing network traffic.

[0010] HTML data which it faces realizing an equipment management system of this invention, and the 2nd demand response means returns, As a result, a client apparatus performs apparatus detailed screen display processing, When a notice of a status change is received, as long as apparatus detailed screen display processing will be rerun, it may be what kind of thing, For example, when a notice of a status change is received in an applet tag for making a client

apparatus perform apparatus detailed screen display processing for HTML data which the 2nd demand response means returns, and a client apparatus, An applet tag for making apparatus detailed screen display processing rerun shall be included.

[0011]When use of the HTML data ends HTML data which the 2nd demand response means returns, while considering it as data to which it is made to notify that a display of an apparatus detailed screen was completed to a managing server to a client apparatus, When it is reported that a display of an apparatus detailed screen was completed to a managing server, an erasing means which eliminates information about a client apparatus which took out the notice concerned from a memory measure may be added. If constituted in this way, in a managing server, a client apparatus (namely, client apparatus which should send out a notice of a status change) with which a display of an apparatus detailed screen is performed can be managed easily.

[0012]It faces realizing an equipment management system of this invention, and, naturally a function as a client apparatus may be added to a managing server.

[0013]What kind of apparatus may administration object apparatus built into this equipment management system be, for example, can be used as a network

printer. What kind of thing may a communications protocol between administration object apparatus and a managing server be, for example, a means to report that a state changed with SNMP traps to a managing server as a reporting means of administration object apparatus can be adopted.

[0014]Managing servers of this invention are one or more sets of administration object apparatus, and a managing server with which one or more sets of browsers are connected to an available client apparatus via communication media, When a screen information demand including information which specifies administration object apparatus is received from a client apparatus, The 1st demand response means which acquires state information from administration object apparatus specified for the information concerned via communication media, and supplies screen information according to the state information to a client apparatus which advanced a screen information demand, When an apparatus detailed screen demand including information which specifies administration object apparatus is received from a client apparatus, The demand to a taken-out client apparatus the client apparatus, When it is HTML data which will perform apparatus detailed screen display processing which is the processing which displays an apparatus detailed screen based on screen



information which advanced a screen information demand and was supplied as the response and a notice of a status change is received, A memory measure which memorizes information which can specify the 2nd demand response means which returns HTML data which will rerun apparatus detailed screen display processing, a client apparatus with which HTML data were supplied by this 2nd demand response means, and administration object apparatus related to supplied HTML data, A specifying means which specifies a client apparatus which shows a device detailed screen of the administration object apparatus based on information memorized by memory measure when it is reported that a state changed from administration object apparatus, It has a notice delivery means of a status change which sends out a notice of a status change to a client apparatus specified by this specifying means.

[0015]An equipment management system which can grasp a state of administration object apparatus in real time by a web browser will be obtained without increasing network traffic, if it uses combining administration object apparatus provided with various means which described this managing server above.

[0016]When a managing server of this invention is constituted and a notice of a

status change is received in an applet tag for making a client apparatus perform apparatus detailed screen display processing, and a client apparatus as the 2nd demand response means, A means to return HTML data containing an applet tag for making apparatus detailed screen display processing rerun can be used.

[0017]When use of the HTML data ends HTML data which it faces constituting a managing server of this invention, and the 2nd demand response means returns, While considering it as data to which it is made to notify that a display of an apparatus detailed screen was completed to a managing server to a client apparatus, When it is reported that a display of an apparatus detailed screen was completed, an erasing means which eliminates information about a client apparatus which took out the notice concerned from a memory measure can also be added.

[0018]A recording medium which can computer read this invention, It is a managing server with which one or more sets of one or more sets of administration object apparatus and browsers are connected to an available client apparatus via communication media for a computer, When a screen information demand including information which specifies administration object apparatus is received from a client apparatus, The 1st demand response means

which acquires state information from administration object apparatus specified for the information concerned via communication media, and supplies screen information according to the state information to a client apparatus which advanced a screen information demand, When an apparatus detailed screen demand including information which specifies administration object apparatus is received from a client apparatus, The demand to a taken-out client apparatus the client apparatus, When it is HTML data which will perform apparatus detailed screen display processing which is the processing which displays an apparatus detailed screen based on screen information which advanced a screen information demand and was supplied as the response and a notice of a status change is received, The 2nd demand response means which returns HTML data which will rerun apparatus detailed screen display processing, and a client apparatus with which HTML data were supplied by this 2nd demand response means, When it is notified that that a state changed from administration object apparatus is a memory measure which memorizes information which can specify administration object apparatus related to supplied HTML data, A specifying means which specifies a client apparatus which shows a device detailed screen of the administration object apparatus based on information memorized by

memory measure, A program for making it operate as a managing server provided with a notice delivery means of a status change which sends out a notice of a status change to a client apparatus specified by this specifying means is recorded.

[0019]If a program in a recording medium in which this computer reading is possible is installed in a computer, the computer concerned can be made to operate as a managing server of this invention.

[0020]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described in detail with reference to drawings.

[0021]The composition of the equipment management system concerning one embodiment of this invention is shown in drawing 1. As illustrated, the equipment management system concerning an embodiment has the composition to which one set of two or more sets of the printers 10 which are administration object apparatus, and the managing server 20, and two or more client apparatus 30 were connected via the communication media 40 (this embodiment LAN cable). In this equipment management system, the device currently generally called the printer with a built-in network, the network printer, etc. and the device which

consists of a printer server and a printer are treated as the printer 10.

[0022]First, overall operation of the equipment management system concerning an embodiment is explained using this figure.

[0023]This equipment management system is a system which is installed in each client apparatus 30 and which can grasp the operating state of each printer 10 in real time by the web browser corresponding to Java.

[0024]A user starts the web browser of the client apparatus 30 and displays the predetermined Web page (it is hereafter written as the top page for equipment management) which the managing server 20 holds to the web browser to grasp the operating state of a certain printer 10 (surveillance). Then, a user displays the apparatus list page which is a Web page currently prepared in the managing server 20 at the web browser using the link formed in the top page for equipment management. It is a list of the model name about each printer 10, a MAC Address, IP addresses, etc., and the list which can choose the printer 10 as which a user wants to grasp an operating state is included in this apparatus list page.

[0025]If a user chooses the printer 10 using an apparatus list page, Transfer of various kinds of information is performed between the client apparatus 30 (web

browser) and the managing server 20 and between the managing server 20 and the printer 10 (it is hereafter written as the object printer 10) which the user chose. And a Web page (it is hereafter displayed as an apparatus detailed page) including the apparatus detailed screen which shows the operating state of the object printer 10 at the time to the display (window of a web browser) of the client apparatus 30 as the result is displayed.

[0026]An example of the apparatus detailed screen included in an apparatus detailed page is shown in drawing 2. As illustrated, the status description character string 32 showing the state of the object printer 10 and the status level image 33, and the printer image 34 showing the appearance of the object printer 10 are included in the apparatus detailed screen 31. The apparatus detailed screen 31 shown in drawing 2 is a thing when the object printer 10 is functioning normally. When a certain problem has arisen in the object printer 10, the apparatus detailed screen 31 including the error image which shows the problem concerned is displayed in the field 36 shown by the dotted-line frame including the status description character string 32 and the status level image 33 of the contents according to the produced problem.

[0027]The equipment management system concerning this embodiment is a

system by which the display information of this apparatus detailed screen 31 is automatically changed when the operating state of the object printer 10 changes.

[0028]Hereafter, the composition of the equipment management system concerning an embodiment and operation are explained concretely.

[0029]First, the hardware constitutions of the printer 10 used for this equipment management system are explained using drawing 3.

[0030]The printer 10 is provided with the control section 110, the control panel 120, and the print station 130 as illustrated. The print station 130 is a mechanism in which printing of a up to [ a paper ] is actually performed. The print station 130 comprises a sheet feeding device, a paper conveyance mechanism, print engine, etc. The control panel 120 is an interface between a user and the printer 10. The control panel 120 comprises the liquid crystal panel and some LED for displaying two or more buttons for specifying the activity of the printer 10, the operating state of the printer 10, etc.

[0031]The control section 110 is provided with the network interface circuit 111, CPU112, RAM113, HDD(hard disk drive) 114, the memory control part 115, ROM116, and the interface circuitry unit 117. The control panel 120 is connected to the interface circuitry unit 117, and the print station 130 is connected to the

interface circuitry unit 117 and the memory control part 115.

[0032]ROM116 is the memory the program code etc. were remembered to be.

CPU112 is a control circuit which controls each part in the control section 110 according to the program code memorized by ROM116. The network interface circuit 111 is a circuit for realizing communication through the communication media 40 among other devices (the server apparatus 20, client apparatus 30).

[0033]RAM113 is memory storage used since the print data received by the network interface circuit 111, the pseudo code generated based on print data, etc. are stored temporarily. HDD114 is an auxiliary storage unit with which the MIB (Management Information Base) database 150 (it mentions later for details) is memorized.

[0034]The memory control part 115 is a circuit which performs processing which transmits data to RAM113 (it is HDD114 depending on the case) from the network interface part 111, processing which transmits data to the print engine within the print station 130 from RAM113, etc. according to directions of CPU112. The interface circuitry unit 117 consists of some interface circuitry for CPU112 to exchange information between the control panel 120 and the conveyer style within the print station 130.



[0035]Next, operation of the printer 10 is explained.

[0036]The functional block diagram of the printer 10 is shown in drawing 4. As illustrated, the printer 10 is operating as a device which consists of the network interface part 301, the print execution part 302, the state detection part 303 and the MIB control section 304, and the MIB database 150. The network interface circuit 111 in drawing 3 is functioning as the network interface part 301, and the portion except the network interface circuit 111 is functioning as the print execution part 302 and the state detection part 303. The portion centering on CPU112 is functioning as the MIB control section 304.

[0037]The network interface part 301 is provided with the following.

The packet transmission and reception part 311 which transmits and receives a packet among other devices via the communication media 40.

The data generating part 312 which reconstructs data from the packet received by the packet transmission and reception part 311.

The network interface part 301, When the data which the data generating part 312 generated is print data, When the data which supplied the data concerned to the print execution part 302, and the data generating part 312 generated is the SNMP (Simple Network Management Protocol) command, It has the data

discrimination section 313 which supplies the data (SNMP command) to the MIB control section 304. The network interface part 301 generates the packet according to the data given from the MIB control section 304, and is provided with the packet generation part 314 supplied to the packet transmission and reception part 311.

[0038]That is, the network interface part 301 supplies the print data which other devices transmitted to printer 10 to the print execution part 302, and supplies the SNMP command which other devices transmitted to printer 10 to the MIB control section 304. The network interface part 301 generates the packet group according to the data given from the MIB control section 304, and transmits on the communication media 40.

[0039]And the print execution part 302 actually performs printing of a up to [ a paper ] based on the print data supplied from the network interface part 301. The state detection part 303 has the function to detect the state of each part of the printer 10.

[0040]The MIB database 150 is a database containing the MIB objects (hrDeviceStatus, prtMakerTech, etc.) defined by RFC1514 (Host resource MIB), RFC1759 (Printer MIB), etc. The MIB control section 304 rewrites the contents of

the MIB database 150 according to the state of each part detected by the state detection part 303. The SNMP manager to whom access is permitted for the data in which the MIB control section 304 was supplied from the network interface part 301 (according to this embodiment.) When it is the SNMP command from the managing server 20, the information (MIB object) according to the demand concerned in the MIB database 150 is returned to the SNMP manager who has transmitted the SNMP command by controlling the network interface part 301.

[0041]The MIB control section 304 sends out the SNMP trap which shows that to the managing server 20 (device set up as an address of a trap), when the state of the printer 10 changes. That is, the MIB control section 304 has detected the state of each part, as shown in drawing 5 (Step S101, step S102:NO). And when a state has change (Step S102: YES), the MIB control section 304 updates the contents of the MIB database 150 (Step S103). Subsequently, by controlling the network interface part 301, the MIB control section 304 sends out the SNMP trap which shows that the state changed to the managing server 20 (Step S104), and returns to Step S101.

[0042]Setting out to the printers 10, such as IP addresses (a Community name,

a TRAP address, etc.) of the managing server 20, It is performed by the managing server 20 which is the SNMP manager by whom the information about the printer 10 which is an SNMP Agent which should be managed was set up like the system of a common SNMP base.

[0043]In the printer 10 of the gestalt which is included in an equipment management system and which consists of a printer server and a printer, a printer server processes MIB relation. That is, CPU in a printer server acquires the information which shows a state from a printer, and performs processing of a procedure as shown in drawing 5.

[0044]Next, the composition of the managing server 20 is explained.

[0045]As shown in drawing 6, the managing server 20 used with this equipment management system is provided with the device main frame 210, the display 220, and the input device 230. The device main frame 210 includes the control section 211 and HDD212 which were mutually connected by bus 218, the controlling-display circuit 213, the interface circuitry 214, CD-ROM drive 215, and the network interface circuit 216.

[0046]The control section 211 is a unit which controls each part in the managing server 20 integrative, and consists of CPU211a, ROM211b, RAM211c, etc. The

controlling-display circuit 213 is a circuit which the control section 211 uses in order to display a picture on the display 220. The input device 230 is a device used in order that a system administrator may issue various kinds of directions to the managing server 20 (control section 211), and consists of a mouse, a keyboard, etc. When the network interface circuit 216 performs communication with other devices using the communication media 40, it is a circuit which the control section 211 uses.

[0047]HDD212 is the auxiliary storage unit which memorized various kinds of programs developed for these systems with OS (this embodiment Windows 95/98/NT). The Java applet file which the control section 211 according to those programs uses for this HDD212, the HTML document file, the image file for apparatus detailed screen 31, etc. are memorized.

[0048]CD-ROM drive 215 is a read-out device of CD-ROM70. Installation of the various software of HDD212 is performed from the auxiliary storage unit of other devices using this CD-ROM215, using the network interface circuit 216 from CD-ROM70.

[0049]That is, the managing server 20 is what installed in the computer of general composition the program developed to these systems, and data. Since it

is a device without the place which changes with the computer of general composition also in hardware and by software, each client apparatus 30 contained in this system omits explanation of the composition.

[0050] Hereafter, the composition of the managing server 20 and operation are more concretely explained using drawing 7 which is a functional block diagram of the managing server 20.

[0051] When the control section 211 performs operation according to various programs, the managing server 20 operates as a device which has the network interface part 21, Web server part 22, the screen information generation part 23, the trap processing part 24, and the storage parts store 25. The network interface circuit 216 in drawing 6 is functioning as the network interface part 21. The control section 211 functions as Web server part 22, the screen information generation part 23, and the trap processing part 24, and HDDD212 is functioning as the storage parts store 25.

[0052] Hereafter, operation of each part shown in drawing 7 is explained.

[0053] The network interface part 21 reconstructs one data based on one or more TCP/IP packets which received from the communication media 40. And the data concerned is supplied to Web server part 22 or the trap processing part 24

according to the protocol number and port number which were contained in each packet. The network interface part 21 supplies a HTTP (hypertext transfer protocol) request and the SNMP command to Web server part 22, and, more specifically, supplies an SNMP trap to the trap processing part 24. The network interface part 21 generates the TCP/IP packet according to the data given from Web server part 22 or the trap processing part 24, and transmits on the communication media 40.

[0054]The storage parts store 25 holds the image data file and Java applet class file which Web server part 22 and the screen information generation part 23 use, the HTML document file, etc.

[0055]More specifically, the storage parts store 25 holds the status level images 33a-33e matched with the prtAlertSeverityLevel value and the prtAlertTrainingLevel value, as shown in drawing 8. The storage parts store 25 holds the printer images 34a-34c matched with the prtMakerTech value, as shown in drawing 9. The storage parts store 25 also holds the printer image about two or more specific models matched with the hrDeviceDescr value. The storage parts store 25 holds six sorts of error images 35a-35f matched with the hrDeviceStatus value, the hrPrinterStatus value, and the

hrPrinterDetectedErrorState value, as shown in drawing 10.

[0056]Web server part 22 processes the HTTP request inputted via the network interface part 21. That is, Web server part 22 reads the file concerned from the storage parts store 25, when a certain client apparatus 30 (web browser) has required the file. And a header is attached to the file and the client apparatus 30 which advanced the demand concerned is returned. Web server part 22 passes the demand to the screen information generation part 23, when the client apparatus 30 advances a specific demand. And the screen information generation part 23 attaches a header to the data returned as a response to the demand concerned, and returns the client apparatus 30.

[0057]The screen information generation part 23 performs various kinds of processings according to the contents of the demand from the client apparatus 30 (web browser) inputted via the network interface part 21 and Web server part 22.

[0058]Hereafter, the processing which the screen information generation part 23 performs is explained concretely.

[0059]As already explained, a user chooses the printer 10 on which the apparatus detailed screen 31 is displayed using the apparatus list page



displayed on the client apparatus 30.

[0060]When the printer 10 is chosen, the client apparatus 30 (web browser) transmits the apparatus detailed screen demand to which the identification information (this embodiment IP address) of the printer 10 concerned was added as a parameter. If it puts in another way, the apparatus list page supplied to the client apparatus 30 serves as a HTML document which makes such operation perform to the client apparatus 30 (web browser) from the managing server 20.

[0061]The screen information generation part 23 which an apparatus detailed screen demand is a demand processed by the screen information generation part 23, and received the apparatus detailed screen demand via Web server part 22, Based on the model of the HTML document currently prepared in the storage parts store 25, A web browser downloads the applet for a display, and the applet for a notice, It is a performed HTML document for apparatus detailed pages (HTML document containing the applet tag for the applets for a display, and the applet tag for the applets for a notice), The parameter (namely, IP address of the printer 10 which should display details) added to the apparatus detailed screen demand creates the HTML document for apparatus detailed pages passed to each applet. And the screen information generation part 23 returns the created

HTML document for apparatus detailed pages to the client apparatus 30 which advanced the apparatus detailed screen demand via Web server part 22.

[0062]The applet for a display downloaded by the web browser which displayed the HTML document for apparatus detailed pages is an applet for displaying the apparatus detailed screen 31 on a web browser. The web browser which performed the applet for a display, The screen information demand which will be processed in the screen information generation part 23 is transmitted, and the apparatus detailed screen 31 is displayed based on the screen information (file name about the status description character string 32 and the images 33 and 34, etc.) obtained as a response to the demand.

[0063]On the other hand, the screen information generation part 23 which received the screen information demand generates picture information by operating in the procedure shown in drawing 11.

[0064]That is, the screen information generation part 23 acquires prtAlertTable information from the MIB database 150 of the object printer 10 (printer 10 which has the IP address added to the screen information demand), when a screen information demand is received (Step S201). And based on the acquired information, the status description character string used for the apparatus

detailed screen 31 is specified (Step S202).

[0065]every by which the screen information generation part 23 is more specifically contained in the MIB database 150 of the object printer 10 in Step S201 -- every under prtAlertGroup -- a prtAlertCode value is acquired. And in Step S202, the screen information generation part 23 specifies some status description character strings showing the state of the printer 10 based on the acquired value with reference to the status description character string table which self holds. Here with a status description character string table. As shown in drawing 12, it is the table which matched the status description character string to each prtAlertCode value about each prtAlertGroup which may exist in the MIB database 150 of the printer 10.

[0066]When prtAlertTable of the MIB database 150 of the object printer 10 is empty, the screen information generation part 23, In Step S101, the value of the offline bit of hrPrinterDetectedErrorState contained in the MIB database 150 is seen. And in Step S102, when the offline bit is set, the screen information generation part 23. "state: -- the case where made off-line" into the status description character string, and the offline bit is not set -- "state: -- let "be a status description character string during operation normally.

[0067]After specifying one or more status description character strings in such a procedure, the screen information generation part 23, The value of prtAlertSeverityLevel and prtAlertTrainingLevel is acquired from the MIB database 150 of the object printer 10 (drawing 11: Step S203). And based on the acquired value, the status level image 33 included in the apparatus detailed screen 31 is specified (Step S204).

[0068]In this step S204, the screen information generation part 23, When prtAlertSeverityLevel values are "other", "warning", and a "communication error", Respectively, the status level images 33a, 33c, and 33e (refer to drawing 8) are specified as the status level image 33 included in the apparatus detailed screen 31. A prtAlertSeverityLevel value is "critical", When a prtAlertTrainingLevel value is "fieldservice", the screen information generation part 23 specifies the status level image 33c as the status level image 33. A prtAlertSeverityLevel value is "critical", When a prtAlertTrainingLevel value is not "fieldservice", the screen information generation part 23 specifies the status level image 33d as the status level image 33.

[0069]After specifying the status level image 33, the screen information generation part 23 acquires prtMakerTech and a hrDeviceDescr value from the

MIB database 150 of the object printer 10 (Step S205). And the screen information generation part 23 specifies the printer image 34 included in the apparatus detailed screen 31 based on the acquired information (Step S206). [0070]In this step S206, it is judged based on the hrDeviceDescr value acquired from the object printer 10 whether the printer image for that object printer 10 is prepared. And when the printer image for object printer 10 is prepared, the printer image is specified as the printer image 34 included in the apparatus detailed screen 31. When the object printer 10 is a device of a model with which the printer image for exclusive use is not prepared, Either of the general-purpose selected printer images 34a-34c according to a prtMakerTech value (refer to drawing 9) is specified as the printer image 34 included in the apparatus detailed screen 31.

[0071]After [ of the printer image 34 ] specific and the screen information generation part 23 acquire hrDeviceStatus of the MIB database 150 of the object printer 10, hrPrinterStatus, and hrPrinterDetectedErrorState (Step S207). And some error images 35 used for the apparatus detailed screen 31 based on the acquired value are specified (Step S208).

[0072]The screen information generation part 23 Namely, hrDeviceStatus, The

error image according to the value acquired from the object printer 10 is specified out of six sorts of error images 35a-35f (refer to drawing 10) matched with the value of hrPrinterStatus and hrPrinterDetectedErrorState. When hrPrinterDetectedErrorState is noToner, the screen information generation part 23, Based on the acquired prtMakerTech value, it determines whether to use the error image 35d of whether the error image 35c of \*\* is used, and \*\* [ "with / no toner" / "with no ink" ].

[0073]After specifying the status description character string 33, the printer image 34, and the error image 35 which are included in the apparatus detailed screen 31 in such a procedure, the screen information generation part 23, The specified status description character string 33 and the screen information which is data of the predetermined format containing the file name of each specified image are created. And the screen information is returned to Web server 22 as a response to a screen information demand (drawing 11: Step S209).

[0074]Web server 22 returns the screen information to the client apparatus 30 which advanced the screen information demand. The web browser (applet for a display) of the client apparatus 30 requires the image which has each file name contained in screen information of the managing server 20 while displaying the

status description character string 33 contained in the screen information. And the apparatus detailed screen 31 (refer to drawing 2) is displayed by arranging each image which Web server part 22 returns as a response to each demand in the position specified (display).

[0075]Next, explanation about the applet for a notice performed with the applet for a display is given at the time of the display of an apparatus detailed page.

[0076]As shown in drawing 13 (A), the client apparatus 30 with which the applet for a notice was performed, First, a notice request request (HTTP request) including the IP address of an own IP address, the port number used for reception of status-change notice packets, and the object printer 10 is transmitted to the managing server 20 (Step S301). Then, the client apparatus 30 makes the preparations for receiving the status-change notice packets (it mentions later for details) which are UDP packets (Step S302), and stands by that status-change notice packets are received (Step S303). And when status-change notice packets are received, the applet for a display is made to rerun (Step S304), and it returns to Step S303.

[0077]On the other hand, if the trap processing part 24 in the managing server 20 is started, as shown in drawing 13 (B), it will make the preparations for

receiving the SNMP trap from the printer 10 (Step S401). Then, when the trap processing part 24 stands by that an SNMP trap is received (Step S402) and an SNMP trap is received. The client apparatus 30 which shows the apparatus detailed screen 31 about the printer 10 where self sent out the SNMP trap based on the information in the utilizing state management table held and managed is specified (Step S403).

[0078]The utilizing state management table in which those contents are referred to at this step S403 is a table where the contents of the notice request request advanced by the applet for a notice are memorized. Renewal of contents of a utilizing state management table is performed by the trap processing part 24 which received the notice request request (two IP addresses and port numbers) via Web server part 22 and the screen information generation part 23.

[0079]When the client apparatus 30 which shows the apparatus detailed screen 31 about the printer 10 which has sent out the SNMP trap is able to be specified (Step S404; YES), The trap processing part 24 returns to Step S402, after transmitting the status-change notice packets which made the port number which is matched with the client apparatus 30 and memorized in the utilizing state management table the destination port number to the specified client



apparatus 30 (Step S405). When the client apparatus 30 which, on the other hand, shows the apparatus detailed screen 31 about the printer 10 which has sent out the SNMP trap is not able to be specified (Step S404; NO), The trap processing part 24 returns to Step S402, without transmitting status-change notice packets.

[0080]Although the graphic display is omitted, the trap processing part 24 stands by that the ACK packet to the packet concerned is transmitted after transmission of status-change notice packets. And when an ACK packet is not sent out in predetermined time, the trap processing part 24 sends out status-change notice packets again. Prescribed frequency and when [ even if it resends, ] an ACK packet is not returned, status-change notice packets the trap processing part 24, As that by which the display of the apparatus detailed screen 31 is ended, the information about the client apparatus 30 and printer 10 is deleted from a utilizing state management table.

[0081]The applet for a notice sends out the predetermined HTTP request which includes an own IP address and the IP address of an object printer in the client apparatus 30, when ended (when an apparatus detailed page is closed). Two IP addresses included in this HTTP request are inputted into the trap processing

part 24 via Web server 22 and the screen information generation part 23. And the trap processing part 24 deletes the information related to those IP addresses from a utilizing state management table.

[0082]Namely, information about the client apparatus 30 which actually shows the apparatus detailed page at the time [ management table / utilizing state ] (with the IP address.) The contents are updated so that only the IP address of the port number used for reception of status-change notice packets and the object printer 10 may be included.

[0083]As mentioned above, as explained in detail, each printer 10 in this equipment management system transmits the SNMP trap which shows that to the managing server 20, when an own state changes. The managing server 20 which received the SNMP trap sends out status-change notice packets to the client apparatus 30 with which the apparatus detailed screen 31 of the printer 10 which took out the SNMP trap is displayed. The client apparatus 30 (the applet for a notice and the applet for a display) which received status-change notice packets advances a screen information demand to the managing server 20. The managing server 20 which received the screen information demand acquires the various MIB objects of administration object apparatus again, and carries out

redisplay of the apparatus detailed screen 31 to the client apparatus 30 by supplying the screen information according to the acquired information to the client apparatus 30.

[0084]Since the contents of the apparatus detailed screen 31 are updated in such a procedure, according to this equipment management system, the state of administration object apparatus can be grasped in real time by a web browser, without increasing network traffic.

[0085]Although the equipment management system concerning an embodiment was a system which used the printer 10 as administration object apparatus, it is natural that devices other than a printer may be administration object apparatus. Communication between the printer 10 (administration object apparatus) and the managing server 20 may be made to be performed by not SNMP but the unique protocol.

[0086]

[Effect of the Invention]According to this invention, the equipment management system which can grasp the state of administration object apparatus in real time by a web browser can be obtained in the state where a network resource is not consumed vainly.

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[Translation done.]